

ABSTRACT OF THE DISCLOSURE

A chemical-mechanical polishing process for forming a metallic interconnect includes the steps of providing a semiconductor substrate having a first metallic line thereon, and then forming a dielectric layer over the substrate and the first metallic line. Next, a chemical-mechanical polishing method is used to polish the surface of the dielectric layer. Thereafter, a thin cap layer is formed over the polished dielectric layer. The thin cap layer having a thickness of between 1000-3000Å can be, for example, a silicon dioxide layer, a phosphosilicate glass layer or a silicon-rich oxide layer. The method of forming the cap layer includes depositing silicon oxide using a chemical vapor deposition method with silicane (SiH_4) or tetra-ethyl-ortho-silicate (TEOS) as the main reactive agent. Alternatively, the cap layer can be formed by depositing silicon nitride using a chemical vapor deposition method with silicane or silicon dichlorohydride (SiH_2Cl_2) as the main reactive agent. Finally, a via opening is formed through the dielectric layer and the cap layer, and a second metallic line that couples electrically with the first metallic line through the via opening is formed.